

WHAT IS CLAIMED IS:

1. A method for forming an ethylene-alpha olefin polymer suitable for use as a lubricant base oil comprising:
 - 5 (a) polymerizing an olefin feed containing ethylene and at least one alpha-olefin in the presence of a metallocene catalyst system under conditions sufficient to produce a liquid polymer;
 - (b) isomerizing the liquid polymer in the presence of an acidic isomerization catalyst to produce an isomerized liquid polymer; and
 - 10 (c) hydrogenating the isomerized liquid copolymer in the presence of a hydrogenation catalyst to produce an ethylene - alpha olefin polymer suitable for use as a lubricant base oil.
2. The method of claim 1 wherein the feed comprises 0.1 to
15 85 wt% ethylene and 15 to 99.9 wt% of at least one alpha olefin.
3. The method of claim 2 wherein the alpha olefin has from 3 to about 24 carbon atoms.
- 20 4. The method of claim 2 wherein the polymerizing is conducted in the temperature range of from about 0°C to about 250°C in the substantial absence of molecular hydrogen and at pressures in the range of about 7 kPa (about 1 psi) to about 13.79 MPa (about 2,000 psi).
- 25 5. The method of claim 4 wherein the isomerizing is conducted in the substantial absence of molecular hydrogen at temperatures from about 100°C to about 400°C and pressures from about 7 kPa (about 1 psi) to about 13.79 MPa (about 2,000 psi).

6. The method of claim 4 wherein the hydrogenating is conducted at temperatures in the range of about 100°C to about 350°C and at pressures of about 103 kPa (about 15 psi) to about 13.79 MPa (about 2,000 psi).

5 7. The method of claim 6 wherein the alpha olefin has 3 or 4 carbon atoms.

8. The method of claim 6 wherein the olefin feed contains additional olefins that are substantially inert under said polymerizing condition.

10 9. The method of claim 6 wherein the hydrogenating is conducted under conditions sufficient whereby the polymer has a bromine number less than 2.

15 10. An ethylene-alpha olefin copolymer comprising:

- (a) an ethylene unit content of 0.1 to 85 wt%;
- (b) an alpha olefin unit content of 15 to 99.9 wt%;
- (c) a mixed head to tail and tail to head molecular structure;
- (d) a pour point below about -15°C; and
- 20 (e) a cloud point of not more than 20°C.

11. The copolymer of claim 10 wherein the alpha olefin unit comprises at least one alpha olefin having from 3 to about 24 carbon atoms.

25 12. The copolymer of claim 10 wherein the alpha olefin unit has 3 or 4 carbon atoms.

13. The copolymer of claim 11 or 12 wherein the copolymer has a bromine number less than 2.